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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/945,454

08/31/2001

Steven Verhaverbeke

004936

3536

USA/ETCH/METAL

32588

7590

08/25/2003

APPLIED MATERIALS, INC.
2881 SCOTT BLVD. M/S 2061
SANTA CLARA, CA 95050

EXAMINER

MOORE, KARLA A

ART UNIT

PAPER NUMBER

1763

DATE MAILED: 08/25/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/945,454

Applicant(s)

VERHAVERBEKE ET AL.

Examiner

Karla Moore

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-- The MAILING DATE of this communication appears on the reverse with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 May 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 11,12,14-16,18,20-25,44,45 and 47-51 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 11,12,14-16,18,20-25,44,45 and 47-51 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 August 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 11.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claims 24 and 51 are objected to because of the following informalities: they are dependent on cancelled claims. Examiner assumed they were meant to depend from claims 22 and 47, respectively, and has treated them in the following action as such. Appropriate correction is required.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 11-12, 14-16, 18, 21, 23, 25, 44-45 and 47-51 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,769,952 to Komino in view of U.S. Patent Publication No. 2001/0024691 A1 to Kimura et al.

5. Komino discloses an apparatus for atmospheric and sub-atmospheric processing of a wafer in Figure 1, comprising: an atmospheric transfer chamber (20) having a first wafer handler (22) contained therein; a sub-atmospheric transfer chamber (14) having a second wafer handler (16) contained therein; a first load lock chamber (130A) coupled to said sub-atmospheric chamber and to said atmospheric chamber;

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and a first sub-atmospheric processing module (10A; column 5, rows 48-59) coupled to said sub-atmospheric transfer chamber wherein said sub-atmospheric module is selected from the group consisting of a CVD deposition module, a sputter module, and oxidation module and an anneal module.

6. However, Komino fails to teach the apparatus comprising an integrated particle monitoring module for monitoring particles on a wafer surface coupled to said atmospheric transfer chamber.

7. Kimura et al. teach the use of a sensor for measuring thickness, detecting the presence of foreign particles or recognition of a pattern formed on a substrate coupled to a transfer chamber (Figure 25; paragraphs 49-51, 88, 312 and 323) for the purpose of utilizing records as data for controlling the treatment time of a subsequent step and as data for judging the good or poor state of each treatment step or whether after completion of substrate processing whether the substrate is good or poor.

8. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided a integrated particle monitoring module in Komino in order to utilize records as data for controlling the treatment time of a subsequent step and as data to judge the good or poor state of each treatment step or whether after completion of substrate processing whether the substrate is good or poor as taught by Kimura.

9. Examiner notes that based on the motivation above, it would have been obvious to one of ordinary skill in the art that coupling a monitor/sensor to any sort of transfer chamber, regardless of the pressure maintained in the transfer chamber would have benefits.

10. With respect to claims 12, Komino teaches that the atmospheric processing modules may be used for wet cleaning (column 6, rows 7-15).

11. Examiner notes that Komino additionally teaches that the invention is not limited to the particular processing techniques mentioned in the disclosure for either the atmospheric or sub-atmospheric processing modules (column 6, rows 23-35 and column 11, rows 26-34).

12. With respect to claims 14 and 15, said apparatus further comprises a second load lock (130B) coupled between said atmospheric transfer chamber and said sub-atmospheric chamber. Both the first and second load lock are single wafer load locks (column 7, rows 10-18).

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13. With respect to claim 16, a wafer cassette (24 A and 24 B) is coupled to said atmospheric transfer chamber for providing wafers to be loaded into said atmospheric chamber.

14. With respect to claim 18, the apparatus of Komino further comprises a wet cleaning module (in any of chamber 18 A-C) coupled to said atmospheric transfer chamber and as noted above Kimura teaches control of subsequent processing based on results from the monitoring section which are recorded in a recording means/controller (paragraphs 49-51).

15. With respect to claim 21, 44, 45 and 47, as noted above the monitoring apparatus may also be a CD measurement tool/sensor for recognition of a pattern formed on a substrate or a sensor for measuring thickness (paragraph 88).

16. With respect to claim 23, as noted above any number of etch modules or ashing modules (in any of chambers 10 A-C) may be coupled to said sub-atmospheric chamber (column 5, rows 48-59).

17. With respect to claim 25, as noted above, Kimura teaches control of subsequent processing based on results from the monitoring section which are recorded in a recording means/controller (paragraphs 49-51).

18. With respect to claim 44 and 48, in the invention of Komino, a first and second single wafer thermal process module and a deposition module (in any of chambers 10 A-C) may be coupled to said sub-atmospheric transfer chamber (column 7, rows 25-28).

19. While Komino does not teach deposition of polysilicon in any of the sub-atmospheric chambers they would be capable of depositing polysilicon and this seen as an intended use similar to the limitations of claim 12.

20. With respect to claim 49, as noted above, first and second load locks are coupled between the sub-atmospheric transfer chamber and atmospheric transfer chamber.

21. With respect to claims 50 and 51, as noted above Kimura teaches control of subsequent processing based on results from the monitoring section which are recorded in a recording means/controller (paragraphs 49-51).

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22. Claims 20, 22 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Komino and Kimura as applied to claims 11-12, 14-16, 18, 21, 23, 25, 44-45 and 47-51 above, and further in view Japanese Patent Publication No. 06-177093 A to Matsuo et al.

23. Komino and Kimura disclose the invention substantially as claimed and as described above.

24. However, Komino and Kimura fail to teach an ashing module coupled to said atmospheric transfer chamber, instead the ashing/etching chamber is coupled to the sub-atmospheric chamber so the process can take place at sub-atmospheric pressures.

25. Matsuo teach et al. teach the use of an ashing apparatus that is used at atmospheric pressure for the purpose of improved throughput, reduced cost, etching homogeneity and higher reliability (abstract, JPO and DERWENT).

26. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have carried out an ashing process at atmospheric pressure and to have thus coupled an ashing chamber to the atmospheric transfer chamber in Komino and Kimura in order to achieve increased throughput, reduced cost, etching homogeneity and higher reliability as taught by Matsuo.

27. Claims 11-13, 14-16, 18 and 20-25 are rejected under 35 U.S.C. 103(a) as being unpatentable U.S. Patent Publication No. 2002/0155629 to Fairbairn et al.

28. Fairbairn et al. disclose an apparatus for etching and cleaning a wafer in Figures 9 A-C, comprising: an atmospheric transfer chamber (905b); having a first wafer handler (907) contained therein; a sub-atmospheric transfer chamber (901) having a second wafer handler (904) contained therein; first and second single wafer load locks (903) between the transfer chambers; a single wafer wet cleaning module (911) coupled directly to said atmospheric chamber; modules capable of supplying a processing gas (902 and 909) coupled to said sub-atmospheric transfer chamber; a wafer cassette (908) coupled to said atmospheric transfer chamber for providing wafers to be loaded into said atmospheric transfer chamber; an integrated particle monitoring tool (910) coupled to said atmospheric transfer chamber; and a CD measurement/integrated thickness tool (906a) coupled to said atmospheric chamber.

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29. Fairbairn et al. further teach the use of a controller for controlling the processing modules wherein said controller includes stored instructions for determining the operation of said processing modules depending upon results in said integrated particle monitoring tool or critical dimension monitoring tool (paragraphs 61, 54 and 75 of specification).

30. While Fairbairn does not explicitly teach the processing modules coupled to the sub-atmospheric transfer module as one of a CVD deposition module, sputter module, oxidation module an anneal module, one of ordinary skill in the art would recognize that an etch module capable supplying a gas, like the module disclosed, could be used as a module for the above processes.

31. The courts have ruled that a claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. Ex parte Masham, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987).

32. Fairbairn teaches the concept an apparatus including a controller for controlling a module wherein the controller includes stored instructions for determining the operation of the module depending on instructions from an integrated particle monitoring tool. It would have been obvious to use that with any sort of module, including a wet cleaning module.

Response to Arguments

33. 112 rejections are withdrawn.

34. Applicant's arguments with respect to Komino, Davis et al. and Eriguchi failing to teach "an integrated particle monitoring tool for monitoring particles on a wafer surface" or "an integrated thickness measurement tool" as recited in Applicant's amended claims have been considered but are moot in view of the new ground(s) of rejection.

35. Applicant's arguments filed with respect to the Fairbairn and claims 11-13, 14-16, 18 and 20-25 have been fully considered but they are not fully persuasive. While the amended claim recitations may

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not be anticipated by Fairbairn, they are obvious over Fairbairn. The rejections have been revised to reflect the amendments. As discussed above, Fairbairn fairly suggests the a processing module capable of use for the processes claimed and also fairly suggest controlling a module based on results obtained from a particle monitoring tool.

Conclusion

36. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karla Moore whose telephone number is 703.305.3142. The examiner can normally be reached on Monday-Friday, 8:30am-5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on 703.308.1633. The fax phone numbers for the organization where this application or proceeding is assigned are 703.872.9310 for regular communications and 703.872.9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703.308.0661.

km
August 10, 2003

Primary Examiner
AU 1763
P. Hassanzadeh